

Business Plan Circular Building Strategies

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Circular Housing Asset Renovation & Management

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**Business Plan Circular Building
Strategies**

Project No. NWE 760



UNIVERSITY OF
BIRMINGHAM



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1 Introduction

In this deliverable, we will briefly introduce circular building strategies and explain business models associated with CHARM strategies. An overall mapping will be presented on the sustainable business canvas based on the outcomes of related work packages.

2 Circular Building Strategies

For the implementation of circularity, several frameworks and strategies have been developed in academic and practitioner literature. The ladder of circularity with the 'R-strategies', ranging from Refuse to Recover is probably the most known strategies among social housing organisations (Çetin et al., 2021a). Figure 1 shows ten R-strategies from high to low potential for circularity.

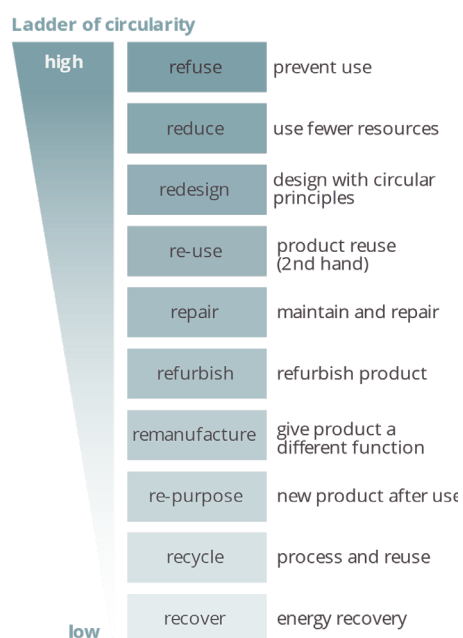


Fig. 1 R-strategies

Social housing organisations can set circular ambitions for the whole organisation, their portfolio and/or individual construction projects for maintenance, renovation, new construction, and demolition. Circular building and asset management strategies can be derived from the national or organisational circular ambitions.

Circular strategies for buildings can be grouped under four core resource management principles: *regenerate* (i.e., improving human-nature interaction and biodiversity), *narrow* (i.e., reducing primary resource use), *slow* (i.e., extending lifetime of products and buildings through repair and maintenance) and *close* (i.e., recovering materials from downcycling through reuse or recycle) (e.g. Çetin et al., 2021b).

In the guideline 'Circular Procurement in 8 Steps', circularity strategies are grouped into: *Decoupling*, *Product and production design*, *Recycling and upcycling* and *Value creation, related to materials, components, systems, building and location* (van Oppen and Bosch, 2020).

In CHARM, each partner demonstrates - in one or more projects - circular asset management strategies. The circular strategies are dealing with the core principles of *slowing* and *closing* resource loops, related to materials, components, systems and buildings: **the reuse of materials (including maintain and repair, and refurbish) and design and construct for reuse after the first use period.**

The CHARM circular asset management strategies demonstrated in the projects can be listed as:

- 1A: reuse of materials from demolition on-site:
 - Paris Habitat: all projects / Zonnige Kempen: Vinkenhof.
- 1B: reuse of materials in new construction:
 - GreenSquareAccord: Stirchley.
 - Zonnige Kempen: Circular office and housing.
- 2: design and construction for reuse after first use period in new construction:
 - GreenSquareAccord: Virtual plastic-free Redditch and Stirchley.
 - Woonbedrijf: Reusable housing units (*not realised*).

3 Sustainable Business Model Canvas

A business model canvas is used to map how a company creates, delivers, and captures value. As shown in Fig. 2, *the sustainable business canvas* places the triple bottom line – people, planet & profit – at the centre of the value proposition and targets to positively impact both society and the natural environment while making profit.

The sustainable business canvas consists of four distinctive aspects:

- **Value proposition:** It is the core element of a business model that outlines the unique value of a product or service that is offered by a company.
- **Value creation:** It consists of the activities and processes a company undertakes to design, produce, and deliver its products or services.
- **Value delivery:** It relates to how a business ensures that the value promised in the value proposition is effectively delivered to customers.
- **Value capture:** It is the aspect of a business model that addresses how a company generates revenue from the value you provide to customers.

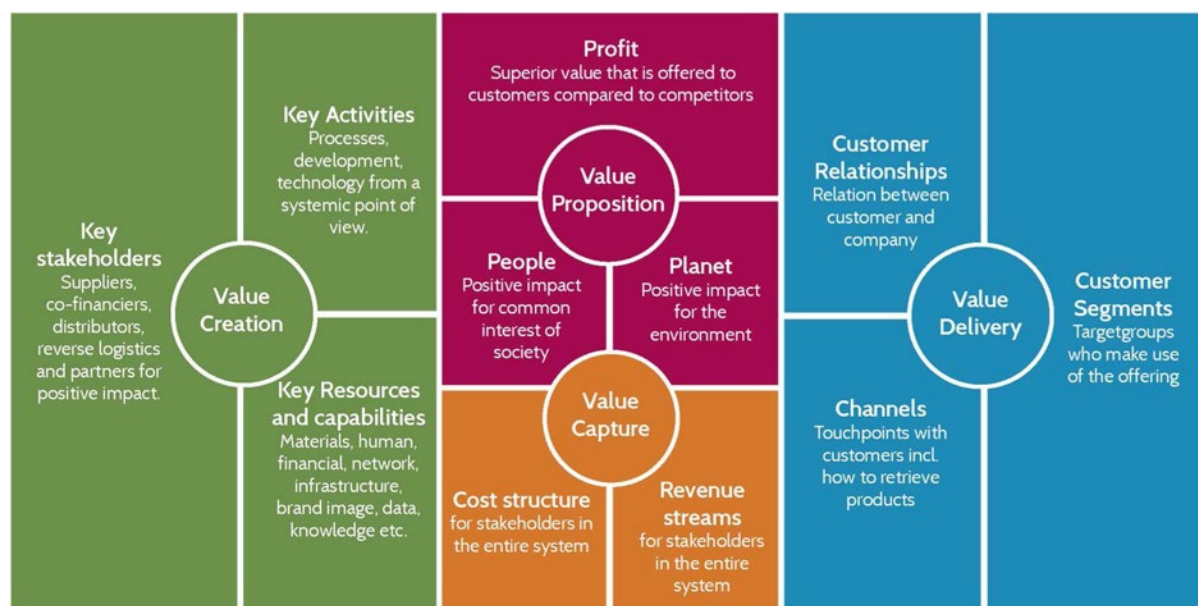


Fig. 2 Sustainable business model canvas (Source: (Bocken et al., 2018)).

4 CHARM Business Model Workshop Demonstration project

On 5 June 2023, a workshop was organised by TU Delft with CHARM partners. The goal of the workshop was to draft a cost-benefit-analysis and supply chain for the building strategies tested in the CHARM projects and to collect those in an overall business plan. Following an introduction, instructors guided participants with the following questions to ask themselves about their strategies and especially the Key Partnerships, Cost Structure and Revenues.

1. **Key partnerships:**
 - Which partners and suppliers do we work with to deliver our value proposition?
2. **Cost structure:**
 - What types of costs are made to operate our business model and deliver our value proposition?
3. **Revenue streams:**
 - How do we create revenues?

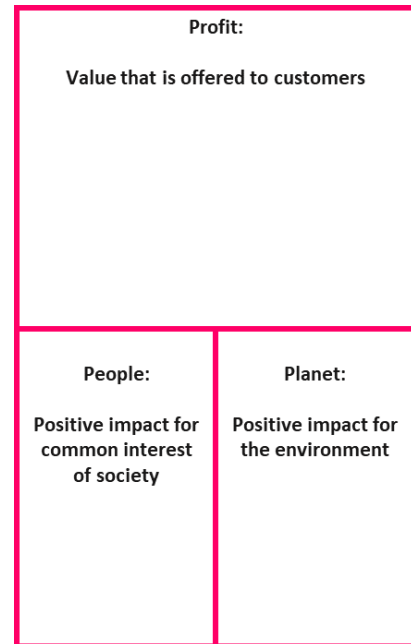
The findings of the workshop are integrated in the following chapter that describes the whole business model of the CHARM circular buildings strategies.

5 Business Model for Demonstration Projects

Following the sustainable business model canvas that is based on people, planet and profit, all CHARM demonstration projects give priority to the **planet** motivation. The primary goal is to reduce waste and emissions, achieved through both immediate material reuse and the proactive prevention of future waste.

Value proposition

Overall CHARM partners have ‘circular’ value propositions, focussing on reducing the need for using raw materials and materials that cause environmental hazards. *Paris Habitat* prevents waste and minimises primary material use by renovating their buildings with reclaimed building components and by repairing and refurbish building components. This occasionally has the character of remanufacturing products into other products. *GreenSquare Accord* developed and built virtually plastic-free dwellings where the aim was to prevent pollution in the long term. *LeefGoed (Zonnige Kempen)* approaches circularity in multiple ways in their demo projects: increasing reuse of materials, preventing waste, educating the employees, and raising tenants’ awareness towards circularity. *Woonbedrijf* designed reusable housing units with the intention of them being used for 15 years on a temporary location and afterwards being re-used at another location.



In the case of *LeefGoed (Zonnige Kempen)*'s circular office and housing project, there is an emphasis on educating the employees, which gained experience with circular practices in their own working environment before starting with housing projects. Also, it is used to showing the tenants how good it can get if you work with re-used materials, thereby increasing the support for applying circular approaches in housing.

In the case of *Woonbedrijf*, the challenge was to build housing that would only be used for 15 years on the intended location. Therefore, it was important to develop these dwellings in a re-usable way, so the houses would not go to waste after 15 years but could be used again on another location. Here the project was also used to raise tenants’ and the general public awareness towards circularity by showcasing the circular design on several occasions.

Value delivery

When employing the canvas to CHARM, we can make a distinction between the customers of the housing - in our case tenants of social housing - and the costumers for the reclaimed materials.

When working with reclaimed materials, employees within the social housing organisations or their supply chain partners, such as architects and contractors, can also be seen as clients, when they act on the demand side for these materials.

Woonbedrijf followed a completely different design process, in which the future tenants were not only treated as customers but also as co-designers. Thus, the channels require much more intensive contact with both internal and external parties and in all demonstration exemplars a lot of attention was paid to awareness activities with housing and material customers.

<p>Customer Relationships:</p> <p>Relation between user and organisation</p>	<p>Customer segments:</p> <p>Target groups who make use of the offering</p>
<p>Channels:</p> <p>Touchpoints between users and organisation</p>	

Value creation

The left side of the sustainable business model canvas focusses on aspects of value creation. First, we have the key stakeholders: who are the partners in the value creation. Second, there are key activities: what is actually done to create the value. And, third, we need key resources: what is necessary to be able to create the value.

Key stakeholders on the left side mirror the so-called material costumers in the value delivery part of the canvas that we just explained. However, more stakeholders could be recognised as key to offer the

circular demonstration projects.

In the case of *GreensquareAccord* the internal architects are the most prominent ones, upfront involvement of internal architects is needed to draw the new technical specifications. But also, consultants, the internal construction team, external (sub-)contractors and suppliers on-site and off-site for the non-plastic alternatives, and quite important warranty providers (assurance companies). The virtually-plastic-free dwellings held specific solutions that are new and not applied before. Not surprisingly, the planning

<p>Key Stakeholders:</p> <p>Internal and external supply chain partners</p>	<p>Key Activities:</p> <p>Processes to produce the product, service and value</p>
	<p>Key Resources & Capabilities:</p> <p>Human, material and financial resources</p>

department of the local authority is also a key stakeholder. Overall, there is a need for early (sub)contractor involvement because of the high innovative nature of the project. For Paris Habitat key stakeholders are architects, contractors, consultants and engineers, but also craftsman, e.g. for remanufacturing wood into furniture, the association for training young people, deconstruction and inspection specialists, knowledge parties on technical properties and qualities, and repair specialists. For *Paris Habitat* as well as *LeefGoed (Zonnige Kempen)* key is "asking new questions to your well-known partners", especially the architects and (sub)contractors the housing associations are used to cooperate with. But we should not forget these stakeholders needed to acquire different skills, procedures and mindsets to adopt the circular strategies.

For *GreensquareAccord*, for example, their factory design team, needed to completely revise their business as usual product to ban the plastics as much as possible. *LeefGoed (Zonnige Kempen)* and *Paris Habitat*, who both emphasise working with reclaimed materials, had to develop expertise to assess the reuse potential and, together with their contractors, find ways to refurbish building components that would have otherwise ended up on the waste pile.

Value capture

The value capture part of the sustainable business model canvas, also the fourth and final part, consists of a simple division between costs and revenues. As we explained when we discussed the value propositions, the approaches developed in CHARM do not lead to additional financial revenues.

The virtually-plastic free dwellings have overall 25% extra cost. This is the reason that the factory LocalHomes still uses the plastic membrane because the non-plastic one is more costly. Unfortunately, a discount on the plastic-free products was not given because the scaling-up was estimated by the suppliers to low. There is a scaling-up potential for the wireless intercom system. There could be extra revenues too, but not quantifiable yet. The dwellings are healthier, e.g., by plastic-free paint (no micro-plastics), that could result in a lower health care insurance. For *Paris Habitat* and *LeefGoed (Zonnige Kempen)*, mainly there are costs involved in making materials re-useable, inspection, re-design, storage, cleaning, and also to construct for future re-usability and waste prevention.

The main financial revenue is that costs are saved because the social housing organisations need to purchase less new materials, now and in the future.

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